

Safety Data Sheet

acc. to OSHA HCS

Revision date: 08/27/2025

1 Identification

- **Product identifier**
- **Product Name: Environmental Spike Mix**
- **Part no. :** 5183-4687
- **Application of the substance / the mixture** Reagents and Standards for Analytical Chemical Laboratory Use
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**
Agilent Technologies, Inc.
5301 Stevens Creek Blvd.
Santa Clara, CA 95051 USA
- **Information department:**
Telephone: 800-227-9770
e-mail: pdl-msds_author@agilent.com
- **Emergency telephone number:** CHEMTREC®: 1-800-424-9300

* 2 Hazard(s) identification

- **Classification of the substance or mixture**



GHS05 Corrosion

Corrosive to Metals 1 H290 May be corrosive to metals.
Eye Damage 1 H318 Causes serious eye damage.



GHS07

Skin Irritation 2 H315 Causes skin irritation.

- **Label elements**
- **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
- **Hazard pictograms**



GHS05

- **Signal word** Danger
- **Hazard-determining components of labeling:**
nitric acid
- **Hazard statements**
H290 May be corrosive to metals.
H315 Causes skin irritation.
H318 Causes serious eye damage.
- **Precautionary statements**
P280 Wear protective gloves / eye protection / face protection.
P234 Keep only in original container.
P264 Wash thoroughly after handling.
P310 Immediately call a poison center/doctor.

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- P321 Specific treatment (see on this label).
 P332+P313 If skin irritation occurs: Get medical advice/attention.
 P302+P352 If on skin: Wash with plenty of water.
 P390 Absorb spillage to prevent material damage.
 P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P362+P364 Take off contaminated clothing and wash it before reuse.
 P406 Store in corrosive resistant container with a resistant inner liner.

· Classification system:
· NFPA ratings (scale 0 - 4)

· HMIS-ratings (scale 0 - 4)

HEALTH	3	Health = 3
FIRE	0	Fire = 0
REACTIVITY	0	Reactivity = 0

· Other hazards
· Results of PBT and vPvB assessment

- **PBT:** Not applicable.
- **vPvB:** Not applicable.

3 Composition/information on ingredients

· Chemical characterization: Mixtures
· Description: Mixture of the substances listed below with nonhazardous additions.

· Dangerous components:

7697-37-2	nitric acid	4.95%
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4 First-aid measures

· Description of first aid measures

- **General information:** Immediately remove any clothing soiled by the product.
- **After inhalation:** In case of unconsciousness place patient stably in side position for transportation.
- **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
- **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
- **After swallowing:** If symptoms persist consult doctor.
- **Information for doctor:**
- **Most important symptoms and effects, both acute and delayed** No further relevant information available.
- **Indication of any immediate medical attention and special treatment needed**
 No further relevant information available.

5 Fire-fighting measures

· Extinguishing media
· Suitable extinguishing agents: Use fire fighting measures that suit the environment.

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- **Special hazards arising from the substance or mixture** No further relevant information available.
- **Advice for firefighters**
- **Protective equipment:** No special measures required.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**

Wear protective equipment. Keep unprotected persons away.

- **Environmental precautions:**

Dilute with plenty of water.

Do not allow to enter sewers/ surface or ground water.

- **Methods and material for containment and cleaning up:**

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Use neutralizing agent.

Dispose contaminated material as waste according to section 13.

- **Reference to other sections**

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

- **Protective Action Criteria for Chemicals**

- **PAC-1:**

7697-37-2	nitric acid	0.16 ppm
7631-99-4	sodium nitrate	3.8 mg/m ³
7757-79-1	potassium nitrate	11 mg/m ³
7782-61-8	iron (III) nitrate nonahydrate	22 mg/m ³
13446-18-9	magnesium nitrate hexahydrate	16 mg/m ³
7664-39-3	hydrogen fluoride	1.0 ppm
1313-27-5	molybdenum trioxide	2.3 mg/m ³
1327-53-3	diarsenic trioxide	0.27 mg/m ³
7440-36-0	antimony	1.5 mg/m ³
7446-08-4	selenium dioxide	0.84 mg/m ³
7761-88-8	silver nitrate	0.047 mg/m ³
7784-27-2	aluminium nitrate	83 mg/m ³
7803-55-6	ammonium trioxovanadate	0.058 mg/m ³
10022-31-8	barium nitrate	2.9 mg/m ³
10022-68-1	Nitric acid, cadmium salt, tetrahydrate	1.2 mg/m ³
10026-22-9	cobalt (II) nitrate hexahydrate	0.3 mg/m ³
10099-74-8	lead dinitrate	0.24 mg/m ³
10102-45-1	thallium nitrate	0.078 mg/m ³
10196-18-6	zinc(II) nitrate hexahydrate	27 mg/m ³
10377-66-9	manganese dinitrate	9.8 mg/m ³
13478-00-7	Nitric acid, nickel(2+) salt, hexahydrate	1.5 mg/m ³
13520-83-7	uranyl nitrate, hexahydrate	1.3 mg/m ³

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· PAC-2:		
7697-37-2	nitric acid	24 ppm
7631-99-4	sodium nitrate	42 mg/m ³
7757-79-1	potassium nitrate	120 mg/m ³
7782-61-8	iron (III) nitrate nonahydrate	110 mg/m ³
13446-18-9	magnesium nitrate hexahydrate	180 mg/m ³
7664-39-3	hydrogen fluoride	24 ppm
1313-27-5	molybdenum trioxide	43 mg/m ³
1327-53-3	diarsenic trioxide	3.0 mg/m ³
7440-36-0	antimony	13 mg/m ³
7446-08-4	selenium dioxide	2.2 mg/m ³
7761-88-8	silver nitrate	39 mg/m ³
7784-27-2	aluminium nitrate	920 mg/m ³
7803-55-6	ammonium trioxovanadate	0.64 mg/m ³
10022-31-8	barium nitrate	350 mg/m ³
10022-68-1	Nitric acid, cadmium salt, tetrahydrate	13 mg/m ³
10026-22-9	cobalt (II) nitrate hexahydrate	23 mg/m ³
10099-74-8	lead dinitrate	180 mg/m ³
10102-45-1	thallium nitrate	4.3 mg/m ³
10196-18-6	zinc(II) nitrate hexahydrate	300 mg/m ³
10377-66-9	manganese dinitrate	16 mg/m ³
13478-00-7	Nitric acid, nickel(2+) salt, hexahydrate	53 mg/m ³
13520-83-7	uranyl nitrate, hexahydrate	7 mg/m ³

· PAC-3:		
7697-37-2	nitric acid	92 ppm
7631-99-4	sodium nitrate	250 mg/m ³
7757-79-1	potassium nitrate	740 mg/m ³
7782-61-8	iron (III) nitrate nonahydrate	640 mg/m ³
13446-18-9	magnesium nitrate hexahydrate	1,100 mg/m ³
7664-39-3	hydrogen fluoride	44 ppm
1313-27-5	molybdenum trioxide	260 mg/m ³
1327-53-3	diarsenic trioxide	9.1 mg/m ³
7440-36-0	antimony	80 mg/m ³
7446-08-4	selenium dioxide	13 mg/m ³
7761-88-8	silver nitrate	230 mg/m ³
7784-27-2	aluminium nitrate	5,500 mg/m ³
7803-55-6	ammonium trioxovanadate	12 mg/m ³
10022-31-8	barium nitrate	2,100 mg/m ³
10022-68-1	Nitric acid, cadmium salt, tetrahydrate	78 mg/m ³
10026-22-9	cobalt (II) nitrate hexahydrate	140 mg/m ³
10099-74-8	lead dinitrate	1,100 mg/m ³

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10102-45-1	thallium nitrate	26 mg/m ³
10196-18-6	zinc(II) nitrate hexahydrate	1,800 mg/m ³
10377-66-9	manganese dinitrate	98 mg/m ³
13478-00-7	Nitric acid, nickel(2+) salt, hexahydrate	320 mg/m ³
13520-83-7	uranyl nitrate, hexahydrate	42 mg/m ³

7 Handling and storage

- **Handling:**
- **Precautions for safe handling** No special precautions are necessary if used correctly.
- **Information about protection against explosions and fires:** No special measures required.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:** No special requirements.
- **Information about storage in one common storage facility:** Not required.
- **Further information about storage conditions:** Keep receptacle tightly sealed.
- **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

- **Additional information about design of technical systems:** No further data; see section 7.
- **Control parameters**

· **Components with limit values that require monitoring at the workplace:**

7697-37-2 nitric acid

PEL	Long-term value: 5 mg/m ³ , 2 ppm
REL	Short-term value: 10 mg/m ³ , 4 ppm Long-term value: 5 mg/m ³ , 2 ppm
TLV	Short-term value: 10 mg/m ³ , 4 ppm Long-term value: 5.2 mg/m ³ , 2 ppm

- **Additional information:** The lists that were valid during the creation were used as basis.
- **Exposure controls**
- **Personal protective equipment:**
- **General protective and hygienic measures:**
 - Keep away from foodstuffs, beverages and feed.
 - Immediately remove all soiled and contaminated clothing.
 - Wash hands before breaks and at the end of work.
 - Avoid contact with the skin.
 - Avoid contact with the eyes and skin.
- **Breathing equipment:**
 - When used as intended with Agilent instruments, the use of the product under normal laboratory conditions and with standard practices does not result in significant airborne exposures and therefore respiratory protection is not needed.
 - Under an emergency condition where a respirator is deemed necessary, use a NIOSH or equivalent approved device/equipment with appropriate organic or acid gas cartridge.
- **Protection of hands:**
 - Although not recommended for constant contact with the chemicals or for clean-up, nitrile gloves 11-13 mil thickness are recommended for normal use. The breakthrough time is 1 hr. For cleaning a spill where there is

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direct contact of the chemical, butyl rubber gloves are recommended 12-15 mil thickness with breakthrough times exceeding 4 hrs. Supplier recommendations should be followed.

- **Material of gloves**

For normal use: nitrile rubber, 11-13 mil thickness

For direct contact with the chemical: butyl rubber, 12-15 mil thickness

- **Penetration time of glove material**

For normal use: nitrile rubber: 1 hour

For direct contact with the chemical: butyl rubber: >4 hours

- **Eye protection:**



Tightly sealed goggles

9 Physical and chemical properties

- **Information on basic physical and chemical properties**

- **General Information**

- **Appearance:**

Form: Fluid

Color: Colored

- **Odor:** Characteristic

- **Odor threshold:** Not determined.

- **pH-value:** Not determined.

- **Change in condition**

Melting point/Melting range: Undetermined.

Boiling point/Boiling range: 100 °C (212 °F)

- **Flash point:** Not applicable.

- **Flammability:** Not applicable.

- **Decomposition temperature:** Not determined.

- **Ignition temperature:** Product is not selfigniting.

- **Danger of explosion:** Product does not present an explosion hazard.

- **Explosion limits:**

Lower: Not determined.

Upper: Not determined.

- **Vapor pressure at 20 °C (68 °F):** 23 hPa (17.3 mm Hg)

- **Density:** Not determined.

- **Relative density** Not determined.

- **Vapor density** Not determined.

- **Evaporation rate** Not determined.

- **Solubility in / Miscibility with**

Water: Fully miscible.

- **Partition coefficient (n-octanol/water):** Not determined.

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· Viscosity:	
Dynamic:	Not determined.
Kinematic:	Not determined.
· Solvent content:	
Water:	94.3 %
VOC content:	0.00 %
	0.0 g/l / 0.00 lb/gal
Solids content:	0.7 %
· Other information	No further relevant information available.

10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability**
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**

- **LD/LC50 values that are relevant for classification:**

7697-37-2 nitric acid

Inhalative | LC50/4 h | 67 mg/L (rat)

- **Primary irritant effect:**
- **on the skin:** Irritant to skin and mucous membranes.
- **on the eye:** Strong irritant with the danger of severe eye injury.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**

The product shows the following dangers according to internally approved calculation methods for preparations:
Irritant

- **Carcinogenic categories**

- **IARC (International Agency for Research on Cancer)**

543-81-7	acetic acid beryllium salt	1
1313-27-5	molybdenum trioxide	2B
1327-53-3	diarsenic trioxide	1
7446-08-4	selenium dioxide	3
10022-68-1	Nitric acid, cadmium salt, tetrahydrate	1
10026-22-9	cobalt (II) nitrate hexahydrate	2B
10099-74-8	lead dinitrate	2A

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13478-00-7	Nitric acid, nickel(2+) salt, hexahydrate	1
· NTP (National Toxicology Program)		
543-81-7	acetic acid beryllium salt	K
1327-53-3	diarsenic trioxide	K
10022-68-1	Nitric acid, cadmium salt, tetrahydrate	K
10099-74-8	lead dinitrate	R
13478-00-7	Nitric acid, nickel(2+) salt, hexahydrate	K
· OSHA-Ca (Occupational Safety & Health Administration)		
1327-53-3	diarsenic trioxide	
10022-68-1	Nitric acid, cadmium salt, tetrahydrate	

12 Ecological information

- **Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability** No further relevant information available.
- **Behavior in environmental systems:**
- **Bioaccumulative potential** No further relevant information available.
- **Mobility in soil** No further relevant information available.
- **Additional ecological information:**
- **General notes:**
 Water hazard class 1 (Self-assessment): slightly hazardous for water
 Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
 Must not reach bodies of water or drainage ditch undiluted or unneutralized.
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Other adverse effects** No further relevant information available.

13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:**
 Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made according to official regulations.
- **Recommended cleansing agent:** Water, if necessary with cleansing agents.

14 Transport information

· UN-Number	
· DOT, IMDG, IATA	UN3264
· UN proper shipping name	
· DOT	Corrosive liquid, acidic, inorganic, n.o.s. (Nitric acid)

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· **IMDG, IATA** CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
(NITRIC ACID)

· **Transport hazard class(es)**

· **DOT**



· **Class** 8 Corrosive substances
· **Label** 8

· **IMDG, IATA**



· **Class** 8 Corrosive substances
· **Label** 8

· **Packing group**

· **DOT, IMDG, IATA** III

· **Environmental hazards:** Not applicable.

· **Special precautions for user** Warning: Corrosive substances

· **Hazard identification number (Kemler code):** 80

· **EMS Number:** F-A,S-B

· **Segregation groups** (SGG1) Acids

· **Stowage Category** A

· **Stowage Code** SW2 Clear of living quarters.

· **Segregation Code** SG36 Stow "separated from" SGG18-alkalis.

SG49 Stow "separated from" SGG6-cyanides

· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**

Not applicable.

· **Transport/Additional information:**

· **DOT**

· **Quantity limitations**

On passenger aircraft/rail: 5 L

On cargo aircraft only: 60 L

· **IMDG**

· **Limited quantities (LQ)**

5L

· **Excepted quantities (EQ)**

Code: E1

Maximum net quantity per inner packaging: 30 ml

Maximum net quantity per outer packaging: 1000 ml

· **UN "Model Regulation":**

UN 3264 CORROSIVE LIQUID, ACIDIC, INORGANIC,
N.O.S. (NITRIC ACID), 8, III

US

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15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**

No further relevant information available.

· **Sara**

· **Section 355 (extremely hazardous substances):**

7697-37-2	nitric acid
7664-39-3	hydrogen fluoride
1327-53-3	diarsenic trioxide

· **Section 313 (Specific toxic chemical listings):**

7697-37-2	nitric acid
7757-79-1	potassium nitrate
7782-61-8	iron (III) nitrate nonahydrate
13446-18-9	magnesium nitrate hexahydrate
7664-39-3	hydrogen fluoride
543-81-7	acetic acid beryllium salt
1313-27-5	molybdenum trioxide
1327-53-3	diarsenic trioxide
7440-36-0	antimony
7446-08-4	selenium dioxide
7761-88-8	silver nitrate
7784-27-2	aluminium nitrate
7789-02-8	chromium (III) nitrate nonahydrate
7803-55-6	ammonium trioxovanadate
10022-31-8	barium nitrate
10022-68-1	Nitric acid, cadmium salt, tetrahydrate
10026-22-9	cobalt (II) nitrate hexahydrate
10031-43-3	cupric nitrate
10099-74-8	lead dinitrate
10102-45-1	thallium nitrate
10196-18-6	zinc(II) nitrate hexahydrate
10377-66-9	manganese dinitrate
13478-00-7	Nitric acid, nickel(2+) salt, hexahydrate

· **TSCA (Toxic Substances Control Act):**

7732-18-5	water	ACTIVE
7697-37-2	nitric acid	ACTIVE
7631-99-4	sodium nitrate	ACTIVE
7757-79-1	potassium nitrate	ACTIVE
7664-39-3	hydrogen fluoride	ACTIVE
1313-27-5	molybdenum trioxide	ACTIVE
1327-53-3	diarsenic trioxide	ACTIVE
7440-36-0	antimony	ACTIVE

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7446-08-4	selenium dioxide	ACTIVE
7761-88-8	silver nitrate	ACTIVE
7803-55-6	ammonium trioxovanadate	ACTIVE
10022-31-8	barium nitrate	ACTIVE
10099-74-8	lead dinitrate	ACTIVE
10102-45-1	thallium nitrate	ACTIVE
10377-66-9	manganese dinitrate	ACTIVE

· Hazardous Air Pollutants

7664-39-3	hydrogen fluoride
1327-53-3	diarsenic trioxide
7446-08-4	selenium dioxide
10022-68-1	Nitric acid, cadmium salt, tetrahydrate
10026-22-9	cobalt (II) nitrate hexahydrate
10099-74-8	lead dinitrate
10377-66-9	manganese dinitrate

· Proposition 65
· Chemicals known to cause cancer:

543-81-7	acetic acid beryllium salt
1313-27-5	molybdenum trioxide
1327-53-3	diarsenic trioxide
10022-68-1	Nitric acid, cadmium salt, tetrahydrate
10099-74-8	lead dinitrate
13478-00-7	Nitric acid, nickel(2+) salt, hexahydrate

· Chemicals known to cause reproductive toxicity for females:

None of the ingredients is listed.

· Chemicals known to cause reproductive toxicity for males:

13478-00-7	Nitric acid, nickel(2+) salt, hexahydrate
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· Chemicals known to cause developmental toxicity:

1327-53-3	diarsenic trioxide
13478-00-7	Nitric acid, nickel(2+) salt, hexahydrate

· Carcinogenic categories
· EPA (Environmental Protection Agency)

1327-53-3	diarsenic trioxide	A
7446-08-4	selenium dioxide	D
10022-31-8	barium nitrate	D, CBD(inh), NL(oral)
10099-74-8	lead dinitrate	B2
10102-45-1	thallium nitrate	II
10377-66-9	manganese dinitrate	D

· TLV (Threshold Limit Value)

1327-53-3	diarsenic trioxide	A1
10022-31-8	barium nitrate	A4

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10099-74-8	lead dinitrate	A3
13520-83-7	uranyl nitrate, hexahydrate	A1
· NIOSH-Ca (National Institute for Occupational Safety and Health)		
543-81-7	acetic acid beryllium salt	
1327-53-3	diarsenic trioxide	
10022-68-1	Nitric acid, cadmium salt, tetrahydrate	
13478-00-7	Nitric acid, nickel(2+) salt, hexahydrate	
13520-83-7	uranyl nitrate, hexahydrate	

· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

The information contained in this document is based on Agilent's state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.

· **Contact:**

· **Date of preparation / last revision** 08/27/2025 / 1

· **Abbreviations and acronyms:**

ADR: Accord relatif au transport international des marchandises dangereuses par route (European Agreement Concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

VOC: Volatile Organic Compounds (USA, EU)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

NIOSH: National Institute for Occupational Safety

OSHA: Occupational Safety & Health

TLV: Threshold Limit Value

PEL: Permissible Exposure Limit

REL: Recommended Exposure Limit

Corrosive to Metals 1: Corrosive to metals – Category 1

Skin Irritation 2: Skin corrosion/irritation – Category 2

Eye Damage 1: Serious eye damage/eye irritation – Category 1

· *** Data compared to the previous version altered.**